



A.D. 1847 N^o 11,817.

S P E C I F I C A T I O N

OF

WILLIAM EDWARD KYAN.

FOR THE IMPROVEMENT OF
MACHINES, &c. OF STEAM ENGINES, COPPERS,
STILLS, &c.

L O N D O N :

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A.D. 1847 N° 11,817.

Furnaces, &c. of Steam Engines, Coppers, Stills, &c.

KYAN'S SPECIFICATION.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, WILLIAM EDWARD KYAN, late of Bark Place, Bayswater, in the County of Middlesex, but now of Westbourne Park Villas, Paddington, in said County, Clerk, send greeting.

5 WHEREAS Her present most Excellent Majesty Queen Victoria, by Her Royal Letters Patent under the Great Seal of the United Kingdom of Great Britain and Ireland, bearing date at Westminster, the Twenty-eighth day of July, in the eleventh year of Her reign, did, for Herself, Her heirs and successors, give and grant unto me, the said William Edward Kyan, my exors, 10 admors, and assigns, Her especial licence, full power, sole privilege and authority, that I, the said William Edward Kyan, my exors, admors, and assigns, or such others as I, the said William Edward Kyan, my exors, admors, or assigns, should at any time agree with, and no others, from time to time and at all times during the term of years therein expressed, should and lawfully 15 might make, use, exercise, and vend, within England, Wales, and the Town of Berwick upon Tweed, the Invention of "IMPROVEMENTS IN CONSUMING THE SMOKE AND ECONOMISING THE FUEL OF STEAM ENGINES, BREWERIES, AND MANU- FACTORIES GENERALLY," communicated to me by a certain foreigner residing abroad; in which said Letters Patent there is contained a proviso that I, the said 20 William Edward Kyan, shall cause a particular description of the nature of the said Invention, and in what manner the same is to be performed, by an

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instrument in writing under my hand and seal, to be enrolled in Her said Majesty's High Court of Chancery within six calendar months next and immediately after the date of the said in part recited Letters Patent, as in and by the same, reference being thereunto had, will more fully and at large appear.

5

NOW KNOW YE, that in compliance with the said proviso, I, the said William Edward Kyan, do hereby declare that the nature of the said Invention, and the manner in which the same is to be performed, are particularly described and ascertained in and by the following statement thereof, reference being had to the Drawing hereunto annexed, and to the figures and letters 10 marked thereon, that is to say:—

The Invention consists of a combination of mechanical means or adaptations to be applied to the furnaces, ash pits, flues, fire doors, door frames, and chimneys of steam engines, boilers, coppers, stills, and pans generally, as hereafter particularly described and represented in the Drawing annexed, to which I make 15 reference, whereby the nature and position of the several parts or adaptations are pointed out, by the combination of which, as herein described, the consuming of the smoke and gas, and the lessening the expense of fuel is advantageously effected. The principle which is carried out by the mechanical means comprised in this Invention is, firstly, to regulate the draught of the 20 chimneys whatever may be their altitude, so that their area of cubical capacity shall not exceed the conjoint areas of the furnace, the space above the bridge, and the fire flue under the boiler, copper, pan, or still. Secondly, by adjusting the admission of atmospheric air at given appropriate points, not only from the ash pit, grate and furnace, doors and door frames, but also by the auxillary 25 means of air flues and ventilators, whereby to afford the precise proportion of air needful to effect the perfect combustion of not only the fuel, but its products of gas and smoke, as either the excess or deficiency of air occasioned by disproportional draught and supply would render equally impossible. In the annexed Drawing Figure 1 is a longitudinal vertical section of a steam 30 boiler of cylindrical form with its furnace. Figure 2 is a transverse sectional plan taken across the furnace near the bridge. Figure 3 is a front view of the furnace doors, ash pit, and ventilators. Figure 1, *a*, the furnace doors; *b*, the plate; *c*, the fire bars; *d*, the bridge; *e*, the air flue; *f*, the fire flue under the boiler; *g*, the latteral or side fire flues. Figure 2, *d*, the bridge; 35 *f*, the fire flue; *g*, the side fire flues. Figure 3, *a*, the furnace doors, the upper one of which has ventilators with regulating slides to admit air over the fuel (without lessening the temperature of the furnace, which partly

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opening the door occasions). This upper door a^1 is opened to supply fuel, and when that is done it is closed, and the lower (plain) door a^2 is then opened, to arrange the position of the fuel on the bars. e is the air flue, with ventilator to regulate the air admitted. h, h , are the ash pit doors, with
 5 their ventilators marked i, i , by which the needful quantum of air is allowed to enter. These doors may be opened in part or wholly on first lighting the fire. There is a second air flue, marked K , which enters the side flue, into which the blaze first passes from the boiler, and this has likewise a ventilator marked l . In addition to the horizontal damper in the chimney to contract
 10 and regulate the draught, there is also a vertical damper fixed on one side of the chimney, with a counterpoise weight, which damper is raised as occasion may require, to supply a volume of air to the chimney, and thereby lessen or stop the draught through the furnace at the time when fuel is supplied and arranged on the bars. The application to the furnaces of round boilers,
 15 coppers, pans, and stills is represented in Figure 4, which is a horizontal section of a round boiler. a , the furnace doors; b , the plate; c , the fire bars; d , the bridge; e , the air flue; f , the flue under the boiler; g , the side fire flue; k , the second air flue entering where the blaze first appears in the side flue; to this there is a ventilator at k . The ash pit doors and furnace doors
 20 are the same as those already described, and are shewn in Figure 5; also the horizontal damper marked l , and vertical one marked m , are the same as before stated. These as to size must be regulated by the area of the chimney. In case there are double side flues, one passing to the right, and the other to the left of the boiler, there must be duplicate air flues marked k , to enter the
 25 side fire flues at the point where the blaze from the copper or boiler bottom first appears to supply air to continue and perfect the ignition of the gas and smoke. The increased altitude of chimnies has been resorted to with a view to abate the nuisance of smoke, but without producing the effect; and the enormous draught of many stacks or chimneys, from their great cubical area,
 30 adds to the evil, when their internal atmospheres become so rarified that their draught is still further increased, insomuch that many of them would suffice for three instead of the one engine furnace to which each of them is attached. Air must be admitted gradually as required; thus, by the admission of a moderate quantum of air through the ventilators of the ash pit doors the fuel
 35 is ignited by the supply of air through the ventilating holes, regulated by slides in the door frame above the doors, or in the hopper door (as the case may be). Combustion is afforded to the gas and smoke while arising in the body of the furnace by the air supplied from the ventilator in the air tube or

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flue which communicates to the back of the bridge; any gas and smoke which escapes from the furnace to the flue under the boiler is ignited; and again, by the ventilator in the second air flue marked *k*, entering the side flue at the end of the boiler near the chimney, still further ignition is attained, and the full completion of the combustion is thus secured by the conjoint action of 5 the whole of these arrangements, which could not be effected by the admission of a large volume of air with undue force at any one of these given points above enumerated.

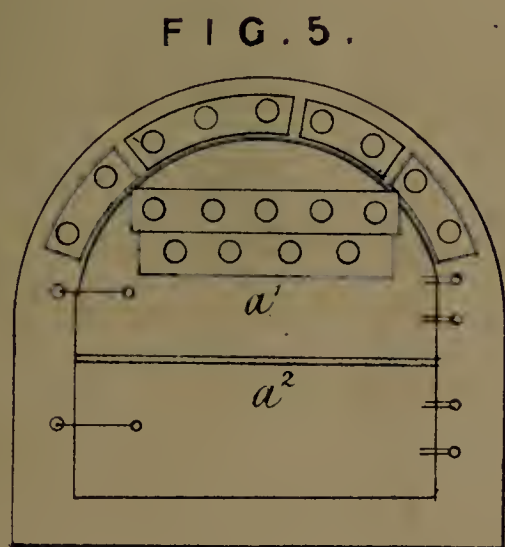
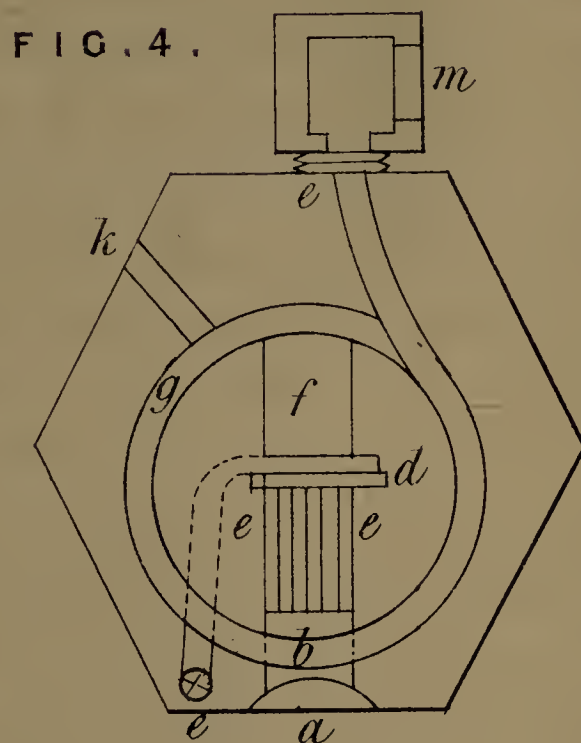
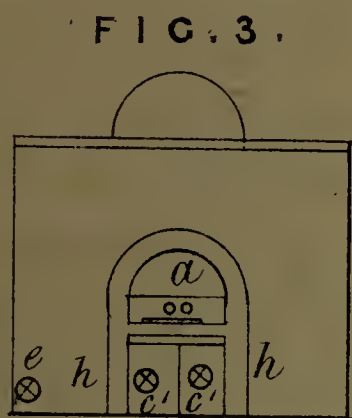
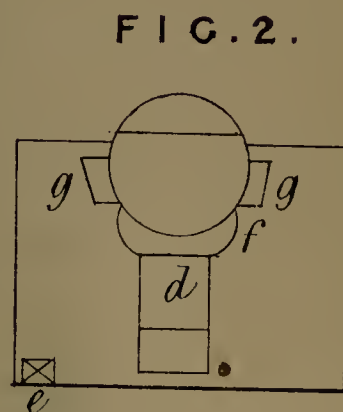
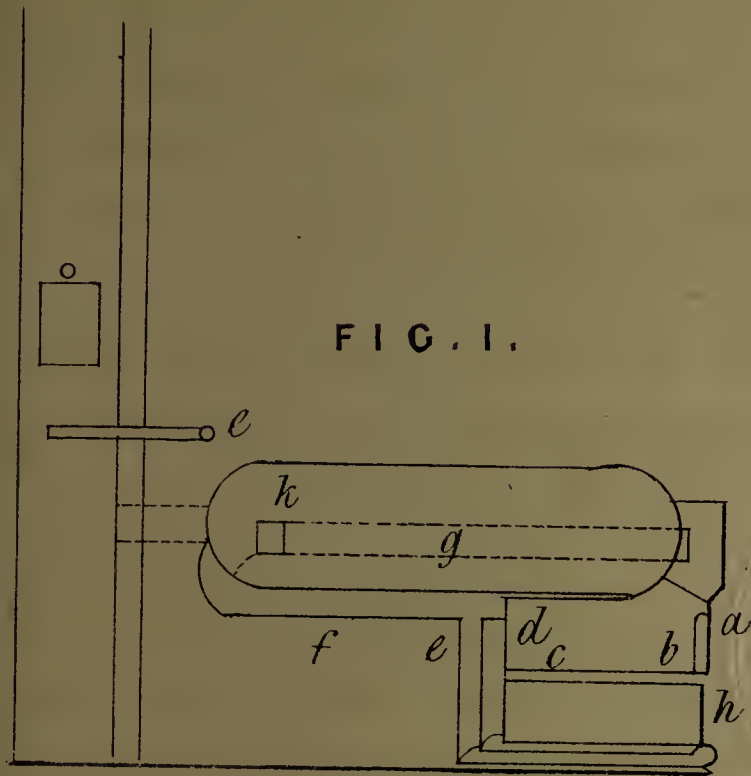
These arrangements are also applicable to the furnace doors and frames, ash pit doors, flues and chimnies of marine steam engines, with modifications 10 suitable to their variety and arrangement; thus, where the boilers are set in brickwork with flues or fire bed passing under the boiler, and side flues surrounding the boiler like those of stationary land engines, the same method of applying the arrangements as before described will answer the purpose; and when the furnace and ash pit are within the boiler the ventilators are to be 15 applied to the ash pit doors, to the furnace door frame, and upper door, and to a metallic pipe to convey air to the back of the bridge, and should there be a side flue, one also to that, the regulating damper to the chimney, and a vertical damper inclosed for safety in a case, open at the bottom, to admit air. 20

As some of the arrangements herein described are old, or have been in use, such as the horizontal damper, the divided furnace door, with apertures therein, and the admission of air at the back of the bridge, I do not claim any one of these separately, but I do claim their application combined with the following improvements; that is to say, the vertical damper marked *m*, the openings in 25 the door frame and slides to cover them occasionally, the side air flue and ventilator *k*, and that marked *e*, the ventilators in the ash pit doors marked *j*, and the tube for conveying the air to the back of the bridge marked *e*, in the manner set forth, to produce by their regulated and united action the effect of more complete combustion by igniting the gas and smoke, and thereby saving 30 fuel to a considerable extent.

In witness whereof, I, the said William Edward Kyan, have hereunto set my hand and seal, this Twenty-seventh day of January, One thousand eight hundred and forty-eight.

W. E. (L.S.) KYAN. 35

KYAN'S SPECIFICATION.



The enrolled drawing is not colored.

Malby & Sons, Lith.

Kyan's Improvements in Consuming the Smoke, &c. of Steam Engines, &c.

AND BE IT REMEMBERED, that on the Twenty-seventh day of January, in the year of our Lord 1848, the aforesaid William Edward Kyan came before our said Lady the Queen in Her Chancery, and acknowledged the Specification aforesaid, and all and everything therein contained 5 and specified, in form above written. And also the Specification aforesaid was stamped according to the tenor of the Statute made for that purpose.

Enrolled the Twenty-eighth day of January, in the year of our Lord
One thousand eight hundred and forty-eight.

LONDON :

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